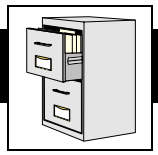

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Ref. 1 Informal Hearing Script

The following contains recommended language which a magistrate may use while conducting an informal hearing. The steps below are based on the discussion in Section 4.3.

Step Two: Call the Case

"Would Officer Howell and Mr. Bay please come forward? Do either of you have any witnesses with you today? Will you both please take a seat?"

Step Three: Explain the Proceeding

"I am Magistrate Smith for the 100th District Court in Whiting. Are you Officer Howell and are you Mr. Bay? We are here for the purpose of an informal hearing. As magistrate, I will preside over this hearing. Based on the evidence, testimony, and application of the appropriate law, I will render a decision. My decision will be a judgment of whether Mr. Bay is responsible or not responsible for the alleged civil traffic violation. I will now describe the informal hearing process. Officer Howell will have the first opportunity to testify as to the reasons and circumstances that caused him to issue the traffic citation. When he has concluded his testimony, Mr. Bay, it will be your opportunity to testify as to what happened and to provide any defense you have concerning this alleged infraction. I reserve the right throughout the hearing to ask either of you questions for purposes of discovering points of fact or clarifying issues raised. I will arrive at my judgment and determine whether or not Mr. Bay is responsible, based on a preponderance of the evidence. Officer Howell or Mr. Bay, either of you may appeal my decision, in which case a formal hearing would be held before a judge."

Step Four: Read the Charge

"Civil traffic infraction No. T13574 alleges that on February 14, 2003, Mr. Bay was operating a Chevy Camaro on Mary Street at or near Cedar Avenue which is in the jurisdiction of Whiting. He was allegedly traveling 40 mph in a 25 mph zone."

"Mr. Bay, do you understand the charge against you? Do you wish to deny responsibility of the charge and continue with this hearing?"

"Are you both ready to proceed?"

Step Five: Administer the Oath

"Will you each (or all parties and their witnesses) please stand and raise your right hand? Do you swear or affirm the information that you are about to give in this matter will be the truth and nothing but the truth?"

Step Six: Take Testimony

"Officer Howell, you may now testify."

After the officer's testimony is presented, you may ask if there is any additional information that the officer wishes to add. You should then follow with testimony from the officer's witness(es).

"Mr. Bay, the officer's side of this case is momentarily concluded. Do you have any questions that you wish me to ask of the officer regarding his testimony?"

"Mr. Bay, it is now your opportunity to present your side of this case."

After the defendant's testimony is presented, you may ask if there is any additional information that he or she wishes to add. You should then follow with testimony from the defendant's witness(es).

"Officer Howell, do you have any questions that you wish me to ask of Mr. Bay regarding his testimony?"

Step Seven: Decide the Case

"The defendant has agreed that he was traveling on Mary Street on February 14, 2003. The charge was that Mr. Bay was driving 40 mph in a 25 mph posted speed zone."

"The court finds the defendant not responsible for driving 40 mph in a 25 mph zone. My reasons for finding Mr. Bay not responsible are the following. First, Officer Howell testified that he was using traffic radar that day and that he had not attended an MCOLES (Michigan Commission on Law Enforcement Standards) radar operator training school. He also testified that he had not verified the unit when he came on duty. These factors are the basis for my finding the defendant not responsible. If the officer reads the *People v Ferency* decision by the Court of Appeals on traffic radar, he will find the recommendations by the Michigan Speed Measurement Task Force that address the issue I just raised. I suggest that the officer discuss these recommendations with his department to prevent the court from having to dismiss radar tickets in the future."

Ref. 2 Informal Hearing Worksheet

Defendant: Charge:

Plaintiff:

Code: Case Number:

TESTIMONY:

FACTS IN DISPUTE:

FACTS:

LAW:

DECISION:

State the question that must be answered:

Note: *The plaintiff has the burden of proof.*

Ref. 3 Checklist of Informal Hearing Proceedings

___ **Step One: Examine the Case File***

The file should contain:

____ The court copy of the citation

____ Form CIA01, *Notice to Appear*

____ Form CIA02, *Judgment*

____ The defendant's driving record (optional) — not to be reviewed prior to hearing

____ The police accident report (optional)

___ **Step Two: Call the Case**

____ Call the parties' names

____ Ask the parties and witnesses to come forward

____ Ensure that all parties and witnesses are present

____ If the defendant is not present, initiate default proceedings

____ If the citing officer is not present, dismiss infraction with prejudice or adjourn hearing, and explain the procedure to those present

___ **Step Three: Explain the Proceeding**

____ Introduce yourself to those present

____ Identify the citing officer and defendant

____ Explain the purpose of an informal hearing

____ Explain the procedures (e.g., taking testimony, questioning, decision-making, sanctioning and right to appeal) to be followed in an informal hearing

____ Answer any questions relating to the hearing

___ **Step Four: Read the Charge**

____ Read the citation number, defendant's name, and the date, time, and location of the alleged civil infraction

____ Read the applicable statutes or regulations

____ Ask whether the defendant understands the charge

* This checklist is based on the discussion in Section 4.3.

____ If the defendant does not understand the charge, explain further

____ Determine whether the defendant still intends to deny responsibility

____ If the defendant admits responsibility, impose sanctions; otherwise, continue

____ Ask officer and defendant if they are ready to proceed

____ **Step Five: Administer the Oath**

____ Swear in all parties and witnesses at once

____ Ask all present to be seated

____ **Step Six: Take Evidence**

____ Request and take the plaintiff's (citing officer's) testimony

____ Request the plaintiff's witnesses' testimony

____ Identify the witnesses' relationship to the case

____ Take the witnesses' testimony

____ If the defendant has questions, direct them to the officer. (To maintain control, do not allow the defendant to question the officer directly.)

____ Request and take the defendant's testimony.

____ Request the defense witnesses' testimony

____ Identify the witnesses' relationship to the case

____ Take the witnesses' testimony

____ If the officer has questions, direct them to the defendant. (To maintain control, do not allow the officer to question the defendant directly.)

____ If necessary, determine additional facts by questioning:

____ The citing officer

____ The defendant

____ The witnesses

____ **Step Seven: Decide the Case**

____ Recite the facts not in dispute

____ Give and explain your decision regarding the disputed facts

____ Relate the facts to the applicable statutes or ordinances

____ State your decision (responsible as charged, responsible for a lesser included offense, not responsible)

____ Give the reasons for your decision

____ **Step Eight: Impose Sanctions**

____ If you found the defendant not responsible:

____ Advise defendant of plaintiff's right of appeal

____ Dismiss all parties and witnesses

____ Ensure that all clerical work connected with the case will be completed

____ If you found the defendant responsible:

____ Advise defendant of right of appeal

____ Dismiss the citing officer and witness

____ Review the defendant's driving record (optional)

____ Determine what sanctions will be imposed

____ Impose the sanctions and inform the defendant

____ Determine whether the defendant can pay the civil fines and costs

____ If the defendant cannot pay, make alternate arrangements

____ Ensure that Form CIA02, *Judgment*, is completed

____ Ensure that a copy of the Judgment is handed to defendant

____ Dismiss the defendant

____ **Step Nine: Complete Case Processing**

____ Ensure that the records of your magisterial activity are updated

____ Call the remaining cases (repeat Steps One through Eight)

____ Ensure that a Form DS-1-22, *Abstract Report of Court Order and Record of Conviction*, is completed for each defendant found responsible for an offense that must be abstracted.

Ref. 4 General Information About Informal Hearings

What is an informal hearing?

An informal hearing is a court proceeding held to decide whether you committed and whether you are responsible for the traffic offense with which you were charged. It is your opportunity to defend yourself, to ask questions, and to have witnesses testify in your favor. The testimony is under oath but the hearing is much less formal than a trial.

How is the hearing different from a trial?

The magistrate, rather than the district judge, usually presides over the hearing. Neither side may be represented by an attorney. There is no jury and no court reporter. The magistrate's final decision will be based on a preponderance, a 51 to 49 percent majority, of the evidence, not on proof beyond a reasonable doubt. In general, the atmosphere will be less formal than that of a trial.

How do I defend myself at the hearing?

You may testify on your own behalf, have witnesses testify on your behalf, and ask questions of the witnesses against you. It is expected that any questioning will be concise, courteous, and not argumentative. You should also present any documents or other physical evidence you might have that supports your case.

In general, remember that the hearing is your "day in court," so come prepared. Have your defense and questions ready.

How do I get my witnesses to appear?

You may ask witnesses to come in voluntarily, or if necessary, you may use the subpoena power of the court to obtain their attendance. Subpoena forms may be obtained from the court clerk.

Must I pay witnesses for appearing?

Yes, if you are the party subpoenaing the witness. Check with the court clerk to find out current witness fee amounts.

May the citing officer bring witnesses?

Yes.

What are the possible outcomes of the hearing?

You may be found:

- Not responsible;
- Responsible; or,
- Responsible for a lesser infraction than the one charged.

What happens if the citing officer fails to appear?

If the officer does not appear the case will be either adjourned (postponed) or dismissed "with prejudice," which means you are not responsible for the offense charged and cannot be charged again in connection with the same incident.

What happens if I fail to appear?

If you fail to appear, the court will enter a default judgment against you. This means the court will automatically find you responsible for the infraction charged, set the fine and costs, and mail you a judgment notice requiring you to pay. If you do not pay the judgment within 28 days, the court will send you a 14-day notice. If you do not pay within 14 days of receiving the notice, your driver's license will be suspended by the Secretary of State and the court may issue a warrant for your arrest.

What are the penalties if I am found responsible?

The maximum fine is $100. In addition, you must pay court costs to cover such expenses as the citing officer's call-in time. However, the maximum court costs are $100. In addition, various fees are applicable to civil infraction violations pursuant to MCL 257.907 and 257.629e.

The magistrate may also require you to attend a program such as driving school if it is necessary to make you a safer driver.

What about violation points?

Points are assessed by the Secretary of State's office when it receives notice from the court that you committed a moving traffic offense. The magistrate who finds you responsible cannot adjust the number of points assessed against you.

Do I have a right to appeal?

If you are found responsible by the magistrate after an informal hearing, you have the right to appeal for a formal hearing before the district judge. If the judge finds you responsible after a formal hearing, you have the right to appeal again to circuit court.

How do I appeal the decision made at an informal hearing?

Within seven days of the judgment, you must complete an appeal form and file it with the court, together with an appeal bond equal to the fine and costs imposed by the magistrate. You do not have to pay a filing fee for the appeal.

What if I have further questions about informal hearings?

Ask any court employee. He or she will answer your question, or find you someone who can. There is one exception: we cannot give you legal advice.

Ref. 5 Forms

CIA01: *Notice to Appear*

CIA03: *Notice of Failure to Comply with Judgment*

CIA04: ***Motion to Set Aside Default Judgment and Order***

CIA05: *Claim of Appeal*

DC21: *Magistrate's Daily Report*

DC22: ***Magistrate's Quarterly Report***

Ref. 6 Code of Judicial Conduct

Ref. 7 Glossary

A

Abstract — A summary of the court's judgment in a moving traffic violation case. The court sends abstracts of determinations of responsibility to the Secretary of State on Form DS-1-22.

Acknowledgment — A person's formal declaration before a judicial officer that a written instrument was his or her free act and deed.

Admission of Responsibility with Explanation — A procedure by which a person charged with a civil infraction admits committing the infraction, but contends the sanctions should be mitigated because of the circumstances surrounding the incident.

Admit Responsibility — In a civil infraction case, to admit responsibility is the equivalent of pleading guilty. The defendant who admits responsibility admits he or she committed the infraction, gives up the right to contest responsibility or explain the circumstances to the court, and pays the civil fine and costs.

Affidavits — Written statements of fact signed and sworn to before a person having authority to administer an oath. In small claims court, a suit is started when the plaintiff files an affidavit with the district court.

Affirmation — Declaration of the truth of one's statements, often made in lieu of oaths by persons whose religious beliefs prohibit them from taking oaths (Compare: Oath).

Appeal — An application to a higher court to change the judgment of a lower court. An appeal of the magistrate's decision in an informal hearing goes to the district judge.

Appearance — The formal act of submitting to a court's jurisdiction. A personal appearance in court is not always necessary to constitute an appearance. In a civil infraction case, a defendant may submit to the court's jurisdiction by mail or by representation.

Appearance by Representation — In a civil infraction case, an appearance by representation occurs when another person appears in court on behalf of the defendant to respond to the infraction charged. The person representing the defendant need not be an attorney at law.

Appearance Date — The last day on which the cited defendant may appear without losing the case by default.

Appellate Court — A court that reviews the decisions of lower courts (usually trial courts). In most instances, an appellate court makes its decision based on the transcript or written record of the lower court. In Michigan, the primary appellate courts are the Supreme Court and the Court of Appeals. However, the circuit court hears appeals of district court decisions, and the district court hears appeals of informal hearing decisions by magistrates.

Arraignment — A hearing in court in which persons charged with crimes are informed of the charges, advised of their rights, given the opportunity to answer the charges, and assigned appointed counsel, if necessary. Pretrial motions may be made and bail is set.

Arrest Warrant — A written order from a judge or magistrate directing an officer to arrest a specific person. To obtain an arrest warrant, the officer seeking the warrant must establish probable cause, i.e., a reasonable belief that the facts justify issuing a warrant.

B

Bail — A method of releasing a person accused of a crime before trial. The accused person or someone on the accused's behalf posts security with the court to ensure appearance at later proceedings, such as the trial.

Batching Effect — Spurious target speed display readings due to rapid changes in patrol vehicle speed.

Bond — A financial obligation by the accused or someone on the accused's behalf to guarantee his or her future appearance in court.

C

Calibrate — To physically modify or adjust a device to eliminate a deviation from a known standard in its functioning.

Case File — A file containing the documents pertaining to a case before a court. In a civil infraction case, the file contains the court copy of the citation signed by the defendant, and may also contain the defendant's letter of explanation and a police accident report.

Circuit Court — The trial court of general jurisdiction, with authority over felonies, domestic relations, adoptions, juvenile delinquency and child protection cases, personal protection orders, civil suits in amounts over $25,000, and equity suits. It also hears appeals from the district court.

Citation — (1) A traffic ticket; a document charging a defendant with a traffic offense. The original or court copy of the citation is the complaint, and the misdemeanor or civil infraction copy given to the defendant is the summons. (2) In legal research, a reference to legal authority that supports a statement of law or from which a quotation is taken.

Civil Fine — A monetary penalty that a person who commits a civil infraction must pay.

Civil Infraction — An offense not serious enough to be classified as a "crime," which may subject the defendant to a jail sentence. Persons responsible for a civil infraction may be penalized with a civil fine or other civil sanction. There are three categories of civil infraction: (1) traffic infractions under the Michigan Vehicle Code; (2) state civil infractions; and (3) municipal civil infractions. Not all traffic offenses are civil infractions; some serious traffic offenses are punishable by criminal penalties.

Civil Sanction — A penalty imposed on a person found responsible for a civil infraction. Possible sanctions include a civil fine, court costs, and mandatory attendance at a program, such as a driver-improvement course or drug or alcohol abuse program.

Civil Suit — A noncriminal action in which one private person brings suit against another as a result of an alleged violation of his or her rights.

Common Law — A system of laws that evolved from early English days to the present. It consists of old and accepted customs, precedents and court decisions, old English statutes, and other unwritten but accepted standards. In Michigan, the common law is still in effect except where it has been modified or repealed by statutes.

Complaint — The document that sets forth the allegations against the defendant in a civil or criminal action. In a civil infraction case, the citation serves as the complaint and the plaintiff is the State of Michigan or a local governmental unit.

Contempt of Court — Conduct that obstructs a court in administering justice. A defendant who refuses to obey a court order, such as a judgment for civil fine and costs, is in contempt of court and can be arrested and jailed until the judgment is paid.

Cosine Effect — A condition resulting in an inaccurate reading that occurs whenever a target vehicle does not move in a direct line toward the radar antenna. This effect is negligible whenever the angle between the radar antenna and the target vehicle is eight degrees or less.

- Moving mode: Cosine in the moving mode may result in a higher or lower target speed display.
- Stationary mode: Cosine in the stationary mode may result in a lower target speed display.

Court of Appeals — The appellate court that hears and decides appeals from decisions of the circuit court and the probate court. The losing party in either of those two courts has the right to appeal the decision to the Court of Appeals.

Crime — An offense against the public that is specifically forbidden by law and is punishable by imprisonment. In Michigan, a civil infraction is not a crime.

D

Default — Failing to do what, by law, ought to be done. In a civil infraction case, a default occurs when the defendant fails to answer a citation, or fails to appear at a scheduled hearing.

Default Judgment — Action taken by the court when the defendant fails to respond to a citation. In a civil infraction case, the defendant who defaults is deemed responsible for the infraction. Upon entry of a default judgment, the defendant must pay the civil fine and costs for the offense charged.

Defendant — The person against whom a court action is started. In a civil infraction case, the driver who received a citation is the defendant.

De Novo Trial — A retrial in which the parties start over from the beginning and proceed as if the first hearing never occurred. *De novo* is Latin for anew. An appeal from the decision of an informal hearing results in a formal hearing, i.e., a trial *de novo* in the district court.

Deny Responsibility — In a civil infraction case, to deny responsibility is the equivalent of pleading not guilty. A defendant who denies responsibility for a civil infraction is one who denies committing the infraction and demands an informal court hearing on the charge(s).

Department of State — The Department of State is the agency responsible for maintaining drivers' records and taking license action against bad drivers. It is headed by the Secretary of State.

Dismiss — To order a court action discontinued. Dismissal with prejudice forever bars the right to bring a lawsuit on the same claim or cause. Dismissal without prejudice disposes of the particular lawsuit before the court permits a new lawsuit to be brought based on the same claim or cause.

District Court — A trial court of limited jurisdiction that handles most misdemeanor trials, civil suits in amounts of $25,000 or less, and summary proceedings for possession of real estate. Preliminary proceedings in all adult criminal cases (e.g., arraignment, preliminary examination) take place in the district court.

E

Equipment Certification — A Michigan Speed Measurement Task Force classification which verifies that a particular radar unit is fit and approved for use during speed enforcement activities.

Equity — A system of legal principles and remedies in civil cases that originated in England and survives in modern U.S. jurisprudence. Historically, there were two distinct courts in England—courts of law and courts of equity. Courts of law could award monetary damages in civil cases, but could give no other relief. If a party sought relief other than monetary damages, he or she had to turn to a court of equity, which could grant injunctions, grant divorces, afford relief from creditors in bankruptcy, etc. There are no longer separate courts of law and equity in the U.S.; most trial

courts can now issue both monetary and non-monetary relief. Different legal principles still apply to law and equity actions, however, and a few procedural distinctions survive, most notably the absence of a right to a jury trial in cases seeking equitable relief.

F

Felony — A crime that is "a violation of a penal law of this state for which the offender, upon conviction, may be punished by death or by imprisonment for more than 1 year or an offense expressly designated by law to be a felony." MCL 761.1(g). A felony charge is tried in the circuit court.

Felonious Driving — Reckless driving that causes crippling injury to another person. Felonious driving is a felony punishable by up to two years imprisonment and/or a $2,000 fine. MCL 257.626c.

Findings of Fact — A decision by the court resolving the disputed facts in a case. In an informal hearing, findings of fact are made by the magistrate.

Formal Hearing — A hearing held to determine whether or not the defendant committed a civil infraction. Only a district judge may conduct formal hearings. The prosecutor, citing police officer, defendant, defense attorney (if the defendant retains one), and witnesses are present at a formal hearing.

Friend of the Court — An official connected with the circuit court who investigates domestic relations cases involving minor children; advises the circuit court regarding those cases; and enforces the court's orders in these cases.

G

Garnishment — A court order to take part of a person's wages, or other money owed to that person before the person receives the money. The person's wages or other money are taken, or garnished, to satisfy an unpaid debt owed to a creditor. The State of Michigan or a local government unit may become a creditor if a defendant found responsible for a civil infraction fails to pay a judgment. See MCL 257.907(10); MSA 9.2607(10).

General Jurisdiction — The authority of a trial court to hear and decide all types of legal disputes, except those specifically reserved for courts of limited jurisdiction. In Michigan, the circuit court is the trial court of general jurisdiction.

H

High Court Misdemeanor (or "Circuit Court" or "Two Year" Misdemeanor) — A term referring to misdemeanors tried in the circuit court rather than the district court. Very few misdemeanors, e.g., negligent homicide, fourth-degree criminal sexual conduct, joyriding, fall into this category. "High court" or "circuit court" or "two year" misdemeanors are punishable by a maximum prison term of two years.

I

Informal Hearing — A hearing held to determine whether the defendant is responsible for the cited civil infraction. Magistrates and district court judges may conduct informal hearings. The citing officer, defendant, and witnesses are present at an informal hearing, but attorneys are not allowed to represent either side. Either side may appeal the magistrate's determination; an appeal results in a formal hearing.

J

Judgment — The decision of a court. In a civil infraction case, the judgment includes a determination of whether the defendant was responsible, and, if he or she is responsible, what sanctions shall be imposed on him or her.

Judicial Notice — The act by which a court will of its own motion, and without the production of evidence, recognize the existence and truth of certain facts.

L

LSMD — The abbreviation for a laser speed measurement device.

Laser — An acronym for Light Amplification by Stimulated Emission of Radiation.

Laser Beam — A conical beam of infrared light emitted by a laser speed measurement device.

LIDAR — The abbreviation for Light Detection and Ranging.

M

MCL (Michigan Compiled Laws) — The official compilation of Michigan statutes published by the Legislative Service Bureau.

MCLA (Michigan Compiled Laws Annotated) — A compilation of Michigan statutes published by West Publishing Company. Although unofficial, MCLA uses the same numbering system as the official compilation, *Michigan Compiled Laws*, and is the compilation most often used by attorneys. In addition to the statutory language, the MCLA contains references to relevant appellate case decisions and historical information about each statute.

MCLS (Michigan Compiled Laws Service) — A compilation of Michigan statutes published by Lexis-Nexis Matthew Bender. Like the *Michigan Compiled Laws Annotated* (MCLA), it is an unofficial compilation but widely used by attorneys. In addition to the statutory language, the MCLS contains references to relevant appellate case decisions and historical information about each statute. The numbering system in MCLS is identical to the MCL and MCLA numbering system.

MCOLES (Michigan Commission on Law Enforcement Standards) — A state commission that prepares and publishes recruitment, selection and

training standards for entry-level Michigan law enforcement officers. The Commission also provides in-service training for law enforcement officers and sets statewide standards for state, county, and municipal law enforcement agencies (including a variety of specialized agencies, such as tribal, railroad, and airport agencies).

MSMTF — The abbreviation for the Michigan Speed Measurement Task Force.

Manslaughter — Pertaining to traffic, reckless driving that results in the death of another person. Manslaughter is a felony punishable by up to 15 years imprisonment and/or a $7,500 fine. MCL 750.321.

Material Defect — A defect on a civil infraction complaint that invalidates the entire complaint because it attacks the very essence of the charge, e.g. failure of the issuing officer to sign the court copy of the citation. Check with your chief judge to determine what else constitutes a material defect.

Michigan Vehicle Code (MVC) — A Michigan legislative act, enacted in 1949 and amended extensively since then, that governs the use of vehicles. The MVC is compiled in Sections 257.1 through 257.923 of the Michigan Compiled Laws (MCL) and Michigan Compiled Laws Annotated (MCLA).

Microwave Oscillator — A radar's antenna energy source.

Misdemeanor — Crimes that are not felonies. In Michigan, the maximum punishment for a misdemeanor is normally one year imprisonment and/or a fine. Most misdemeanors are tried in district court; however, a few are punishable up to two years and are tried in the circuit court.

Mitigate — With respect to civil sanctions, to mitigate means to reduce the severity of the sanctions in light of extenuating circumstances.

N

Negligent Homicide — Negligent (careless or reckless) driving that results in the death of another person. Negligent homicide is a misdemeanor punishable by up to two-years imprisonment and/or a $2,000 fine. MCL 750.324.

No Contest — A plea treated as a guilty plea except that it is not an admission of guilt, but rather an indication of readiness to accept conviction and sentence rather than go to trial. By pleading no contest, a defendant also avoids explaining to the court exactly what he or she did.

Nolo Contendere — Same as no contest; Latin for "I will not contest it."

Oath — An affirmation by a defendant or witness that he or she will testify truthfully.

Operational Area of the Radar Beam — The area of a radar beam in which a valid target reading may be accepted.

P

Panning Effect — A spurious speed display which is caused by pointing the antenna at an electronic display.

Pitch — An audible tone that is determined by the frequency of the vibration of the sound waves.

Plaintiff — The person who initiates a civil or criminal court action against another. In a civil infraction case, the State of Michigan or the local government unit that issued the citation is the plaintiff.

Plea — The defendant's response to a criminal charge. A defendant may plead guilty, not guilty, or no contest.

Power Surge Effect — A term that describes spurious speed displays in speed measurement devices that may be caused by momentary low voltage conditions.

Preponderance of the Evidence — A majority (i.e., 51 percent) of the persuasive evidence. In a civil infraction case, only a preponderance of the evidence is needed to find a defendant responsible for a civil infraction. This standard of proof differs from that used in a criminal trial where the prosecution must prove guilt beyond a reasonable doubt.

Probate Court — A trial court of limited jurisdiction. The probate court handles wills, trusts, estates, guardianships, conservatorships, and commitments of mentally ill persons.

Procedural Safeguards — Aspects of a criminal proceeding intended to ensure that the accused receives a fair trial. These include jury trial, the right to an attorney (if the defendant has no money, one is appointed at state expense), and the requirement of proof beyond a reasonable doubt.

Q

Quasi-Judicial — Having a partly judicial character, as applied to the magistrate's authority and duties. The district court magistrate must make a number of decisions similar to those made by judges and must abide by standards of conduct that apply to judges.

R

Radar — An acronym for Radio Detection and Ranging.

Radar Beam — A directional cone-shaped beam originating from the antenna of a radar unit.

Radar Operator Certification — A Michigan Commission on Law Enforcement Standards (MCOLES) classification, which entitles the holder to operate a traffic radar device.

Radar Instructor Certification — A Michigan Commission on Law Enforcement Standards (MCOLES) classification, which entitles the holder to instruct the Michigan Radar Operator Training Course and the Update Radar Operator Training programs.

Remand — To return a legal dispute to the lower court that originally decided it with instructions on how to handle the dispute. A higher court usually will remand cases only when the lower court incorrectly applied the law or rules of evidence or procedure, and the lower court's errors affected the outcome of the case.

Responsible — In a civil infraction case, the legal status of having committed the infraction charged. It is the equivalent of being found guilty in a criminal case.

S

Sanctions — Penalties, prescribed by law, to be imposed on those who violate the law. The sanctions imposed on those who commit a civil infraction are called civil sanctions. They may include a civil fine, court costs, and a program of education, treatment, or rehabilitation.

Scanning Effect — A spurious speed display on a speed measurement device caused by either rapid movement of the antenna, or by pointing it at a source of mechanical interference.

Search Warrant — A written order from a judge or magistrate directing an officer to search a specific place for a specific object, issued upon a showing of probable cause.

Secretary of State — The Michigan Department of State is headed by an elected official called the Secretary of State. The Department of State is the agency responsible for maintaining drivers' records and taking license action against bad drivers.

Sentence — The punishment imposed upon a defendant following a conviction in a criminal proceeding. In a civil infraction case, the counterpart of a criminal sentence is civil sanctions.

Set Aside — In a civil infraction case, to set aside an admission of responsibility means to cancel it from the record and allow the defendant to offer a different response to the infraction charged. A court may set aside a defendant's admission of responsibility when the facts of the case do not justify an admission.

Shadowing Effect — An erroneous speed display resulting when a moving mode radar unit tracks a slow moving vehicle traveling in the same direction as the patrol vehicle, rather than the road surface or other stationary objects, to measure the patrol vehicle's speed. This lower than actual speed display is the difference in speed between the patrol vehicle and the slow moving vehicle.

*The $3,000 limit took effect January 1, 2000. 1999 PA 27.

Small Claims Court — A division of the district court whose jurisdiction is limited to civil cases where the amount claimed does not exceed $3,000.* Small claims may be heard by the district court judge or by a district court magistrate licensed to practice law in the state. If heard by the magistrate, there is a right to an appeal, de novo, by either party within seven days after decision by the magistrate. When the judge hears the small claim, there is no right of appeal. In either case, no juries or lawyers representing the parties are present.

Speed = Distance Traveled ÷ Elapsed Time — A laser speed measurement formula that states that measured speed equals the distance traveled divided by the elapsed time to travel the distance

Speedmeter — A radar unit that is used to determine vehicle speeds.

Spurious Display — A radar display that is produced by something other than a valid target or patrol vehicle.

Statutes — Laws enacted by the Michigan legislature.

Summons — A notice advising a person that legal proceedings have been started against him or her. In a civil infraction case the citation serves as the summons. It commands the person to appear in court to answer the charges and warns that failure to respond will result in a default judgment being entered.

Superintending Control — Administrative supervision over lower courts. The Michigan Constitution gives the Supreme Court superintending control over all other Michigan Courts. In addition, the circuit court has superintending control over the district and probate courts.

Supreme Court — The highest appellate court in the state; a case may go no further in the Michigan court system. A Michigan Supreme Court decision is final unless reviewed by the federal courts. The Michigan Supreme Court also exercises superintending control over all lower courts, supervises the legal profession, and adopts rules of evidence and procedure.

T

TS = CS - PS — A radar formula that states that target speed equals closing speed minus patrol speed.

Take Under Advisement — To delay final action on a case until an established time period has elapsed. At the end of the established time period, the court will determine whether certain conditions were satisfied or not satisfied and proceed accordingly.

Time - Distance Principle — The basic principle by which a laser speed measurement device operates that states: Elapsed Time = Ending Time - Starting Time.

Tracking History — Supportive evidence, both audio and visual, used to substantiate that a target vehicle is traveling at an excessive rate of speed.

Tracking the target vehicle must take place within a reasonable amount of time.

Traffic Crimes — Violations of the Penal Code or the Michigan Vehicle Code that are defined as crimes, i.e., either felonies or misdemeanors.

Traffic Misdemeanors — Violations of the Michigan Vehicle Code that are defined as misdemeanors. MCL 257.901(1) provides that all violations of the Vehicle Code are misdemeanors unless the violation is specifically declared to be a felony or a civil infraction.

Trial Court — A court that hears and evaluates evidence, decides disputed questions of fact, and applies the law to the facts of specific legal disputes. In Michigan, the trial courts are the probate, district, and circuit courts.

U

Uniform Traffic Code for Michigan Townships and Villages — A model code of local traffic ordinances prepared and distributed by the Michigan Department of State Police.

V

Venue — The geographic boundaries within which court proceedings can be instituted.

Verify — To assess the operational characteristics of a speed measurement device without physical adjustments to the unit from a known standard.

W

With Explanation — A defendant's admission of responsibility for a civil infraction, accompanied by a statement of extenuating circumstances to warrant imposition of less serious civil sanctions.

Without Explanation — A defendant's admission of responsibility for a civil infraction, offered without any statement of extenuating circumstances.

Ref. 8 Publications List

Michigan Vehicle Code (MVC)(Secretary of State Version)

Michigan Department of State
Purchasing and Contract Section
124 W. Allegan, 2nd Floor
Lansing, MI 48918-1444
(517) 373-2570

Uniform Traffic Code For Cities, Townships and Villages

Michigan State Police
Vehicle Code Unit
714 S. Harrison Road
East Lansing, MI 48823
(517) 336-6660

Michigan Statutes and Court Rules

MCL and Court Rules (Soft-Bound)
West Publishing Company
610 Opperman Dr., D-510
PO Box 64779
St. Paul, MN 55164
(800) 328-4880

Court Rules (3-Ring, Loose-Leaf Format)
Darby Printing Co.
6215 Purdue Dr.
Atlanta, GA 30336
(800) 848-2995

MCLS
Lexis-Nexis Matthew Bender
1275 Broadway
Albany, NY 12204
(800) 223-1940

Michigan Manual of Uniform Traffic Control Devices

Michigan Department of Transportation
Traffic and Safety Division
Transportation Building, 2nd Floor
PO Box 30050
Lansing, MI 48909
(517) 373-7558

DNR Law Books/Updates

Available from your local Conservation Officer

Ref. 9 VASCAR

General Description and Definition

VASCAR is a device which, through a programmed computer, measures speed of a vehicle by dividing distance traveled by the time it took to travel that distance. It does not transmit or receive any signal and is therefore not detectable by the driver of the vehicle whose speed is being measured.

VASCAR is an acronym for Visual Average Speed Computer and Recorder.

Component Parts

A VASCAR unit consists of:

- Two toggle switches:
  - — A distance switch (black).
  - — A time switch (red).
- Two push buttons:
  - — A distance recall button (black).
  - — A time recall button (red).
- A thumbwheel switch.
- Power switch (on — off).
- Odometer modular.
- A programmed computer.
- An LED display read-out window.

Overview of General Operation.

By use of the black distance toggle switch, the operator feeds into the computer a specific distance traveled by the patrol vehicle. By use of the red time toggle switch, the operator feeds into the computer the time it took the target vehicle to travel that same distance. The computer then calculates and displays in the read-out window the average speed of the target vehicle, using the formula: Distance divided by Time equals Average Speed.

VASCAR is fair to the motorist in that it measures the average speed of the target vehicle while the target vehicle was traveling the distance between the reference points established by the operator.

How the specific distance and the time are selected and fed into the VASCAR unit is determined by the imagination of the operator. While there are six basic methods (which will be described later), the operator may use his/her imagination in coming up with a variety of methods of selecting a specific distance, feeding that distance into the VASCAR unit computer and then timing the target vehicle while it traverses that specific distance between the two reference points.

Two examples of basic VASCAR use are:

1) The operator selects a distance between two reference points. A reference point is anything that is a visually detectable and identifiable stationary mark on or near the roadway; i.e., a bridge, a sign or pole casting a shadow over the roadway, a painted line going across the roadway, any structure near the roadway casting a shadow over the roadway, a pothole or other clearly defined mark on the roadway surface, etc. The operator "feeds" the distance between these two reference points by driving the patrol car past those two reference points. The operator turns the black distance toggle switch "on" when passing the first reference point, drives to the second reference point and turns the black distance switch "off" at the second reference point. The unit then has the distance programmed into the computer.
2) The officer then observes the target vehicle traveling the same route (direction is immaterial). The officer turns the red time toggle switch "on" when the target vehicle passes one of the reference points and turns the red time toggle switch "off" when the target vehicle passes the other reference point. The time it took the target vehicle to travel the predetermined distance is fed into the computer. The computer then calculates the average speed of the target vehicle (dividing the distance traveled by the time) and the resultant speed is immediately displayed in the LED display window.

Functions of Component Parts

Distance Toggle Switch (Black). Allows the operator to measure a specific distance between two reference points by driving the patrol car past those two reference points. The reference points may be any visually detectable and identifiable stationary mark on or near the roadway. The operator turns the distance toggle switch "on" when the patrol car is opposite the first reference point and turns it "off" when the patrol car is opposite the second reference point. The distance between the two reference points is thereby measured and fed into the computer.

Time Toggle Switch (Red). Allows the operator to measure the time it took the target vehicle to pass between two specific reference points. The operator turns the time toggle switch "on" when the target vehicle is opposite the first reference point and turns it "off" when the target vehicle is opposite the second reference point. The time taken by the target vehicle to travel between the two reference points is thereby measured and fed into the computer.

Programmed Computer. Divides the distance fed into it through the distance time switch, by the time fed into it by the time toggle switch, and calculates the average speed of the target vehicle.

Odometer Module. The odometer module is connected to and driven by the speedometer cable of the patrol vehicle, but is independent of the speedometer and is not related to or dependent upon the accuracy of the speedometer.

Thumbwheel Switch. Allows the operator to feed a specific distance into the VASCAR unit. This is an optional method of feeding a distance into the unit,

versus using the black distance toggle switch while driving the patrol car. The thumbwheel switch is also used to feed information into the unit during the calibration procedure.

Display Read-out Window. An LED window which displays the speed of the target vehicle when calculated by the VASCAR unit. It also displays distances when fed into the unit by the thumbwheel switch.

Power Switch. Turns the unit "on" or "off".

Calibration

Defined. Calibration is an act by the operator to adjust the VASCAR unit so that it will accurately measure distance between two reference points. It is not verification of accuracy, but is rather an adjustment of the unit so that the unit will accurately measure distance.

Need For. The odometer module is driven by the speedometer cable. The speedometer cable is designed to turn 1,000 times in a mile. The odometer module creates 10 pulses per turn. Therefore, if the speedometer cable is turning as designed, the odometer module will create 10,000 pulses per mile. Each pulse is equal to 5,280 x 12 = 6.3 inches. The above is fine, if the patrol vehicle speedometer cable in fact turns 1,000 times per mile. However, tire size, gear lash and other things will affect this -- thus the need to calibrate, or adjust, the unit so that each odometer module pulse is equal to precisely 6.3 inches. When calibration has been accomplished, the VASCAR unit is then "adjusted" to the particular patrol car in which it is installed so that each odometer module pulse is equal to precisely 6.3 inches. However, when the VASCAR unit is turned off, is will revert back to its original status to it must be recalibrated each time the unit is placed in service.

Calibration Procedure. The operator must go through the following steps:

- The operator must first lay out a calibration course, which is a precisely measured specific distance. This should be done on a straight, flat roadway with low traffic volume. The length should be 1/4 of a mile or longer. The operator must be able to verify the exact length of the calibration course.
- The operator must then drive the patrol car to and through the calibration course, doing the following steps:
    - — Turn power switch "off".
    - — Turn thumbwheel switch to all zeros.
    - — Turn power switch "on" (readout display will show all 8's).
    - — Turn thumbwheel switch so as to place course length in display window: if 1/8 mile — 01250; if 1/4 mile — 02500; if 1/3 mile — 03333; and if 1/2 mile — 05000.
    - — Drive through course with black distance switch "on" at start and "off" at end. The calibration number will then show on the display window.

— Put calibration number on thumbwheel. Turn power switch "off", then "on". Display window will show all zeros. The unit is now calibrated.

Verifying Calibration. The operator must again drive through the measured calibration course with both time and distance switches "on" at the beginning and "off" at the end. Push distance recall button and read the displayed distance in the unit display window. An experienced operator should get a reading of plus or minus 0.0001 mile. However, a reading of plus or minus of 1/2 of one percent is acceptable, i.e., for a 1/4 mile course, the reading should be between 0.2488 and 0.2512.

Reference Points

General Description. A reference point can be any visually detectable and identifiable stationary mark on or near the roadway. Examples of reference points are: expansion joints, pot holes, road patches, painted traffic line markers, line of texture or color change from asphalt to concrete, sign posts, mail boxes, utility poles, bridges, overpasses, shadows cast on the roadway, or a part of the police car itself.

Use in Daylight Hours. During daylight hours, the operator pinpoints the exact location of a target vehicle through the use of reference points, such as shadows which cause light density changes. These shadows or light density changes can be caused by either the target vehicle itself or by other objects, such as bridges, trees, signpoles, etc. Even on an overcast day, a vehicle will have a shadow beneath it. In fact, any stationary object can be used for a reference point. The key is to watch for either the shadow cast on the target vehicle by the reference point or the shadow cast by the target vehicle as it passes the reference point.

Use During Nighttime Hours. Night clocking is accomplished much the same as daylight clocking except shadows are no longer available, but we now have headlights which were not available during the daylight hours. Because of the well-defined line of light extending at right angles from the front of the target vehicle across both sides of the road, we know exactly when the vehicle passes an object on the side of the road.

An excellent example would be an interstate guardrail. The target car's light trail follows the guardrail down the highway illuminating it so that it is visible for great distances. The instant the car passes the guardrail, it goes dark and is no longer visible to the eye. A typical rural mailbox, a sign post, a utility pole, and a bridge are other reference points that can be used for night clocks as well as signs and foreign objects on the road.

In almost every case, the VASCAR-plus operator will prefer night clocks to day clocks because of the extreme accuracy and availability of reference points along the highway.

Vehicles and Reference Points. It is very important that whatever part of the target vehicle is used (i.e., front, rear, or shadows) at the beginning of the clock, the same part is used at the end of the clock. This also holds true for the patrol car in measuring the distance.

Consistency in determining when a target vehicle and police vehicle reach any given reference point is imperative. It must be remembered that when the front of a vehicle is used to start a clock, the front must also be used when finishing the clock.

The Element of Reaction Time. Reaction time, which is time lapse between perception and action, is NOT a factor because of anticipation. Anticipation is looking forward to or planning ahead, such as clocking a 100 yard dash — you are anticipating when the runner will break the tape.

The Element of Depth Perception. Depth perception is NOT a factor in clocking cars with VASCAR-plus. As the target car's shadow is cast on the reference point or a shadow created by the reference point is cast on the target vehicle, a light density change is created which can be readily recognizable, thus eliminating the problem of depth perception.

The Basic Speed Clocking Methods

Generally speaking, there are many ways to detect speeders with VASCAR-plus, the number being limited only to situation and imagination of the operation. As an example, one ingenious officer carried two 3-pound aluminum coffee cans in his car's trunk and used them on flat, unmarked roads for reference points by placing them on the side of the roadway. He could detect the shadows of the vehicle on the cans in the daytime and car headlights at night. Also VASCAR-plus is used in aircraft, using the Dial-A-Distance mode.

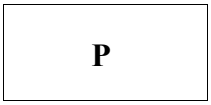
It is very important to remember the basic formula that average speed is distance divided by time. The task then simply becomes one of timing a potential speeder between two reference points "A" and "B", and entering the proper distance. The distance between "A" and "B" is either "driven in" or "dialed in".

The methods listed below with accompanying diagrams are the basic speed clocking methods and consist of:

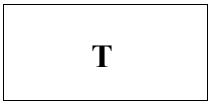
1) Police car following target vehicle.
2) The police car meeting target vehicle from the opposite direction.
3) Police car parked after "driving in a distance".
4) The T-Intersection (not premeasured).
5) Dialing in a premeasured distance.
6) The target vehicle approaching the police car from the rear.

The Legend and diagrams appear below:

Police Car First Position



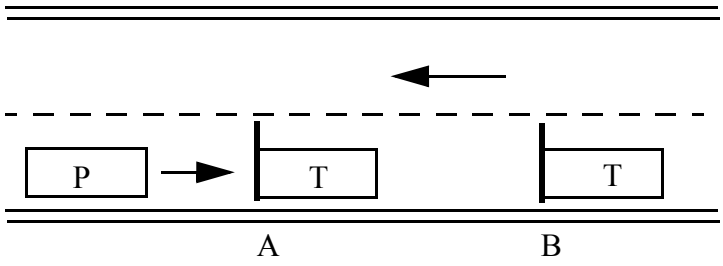
Target Car First Position



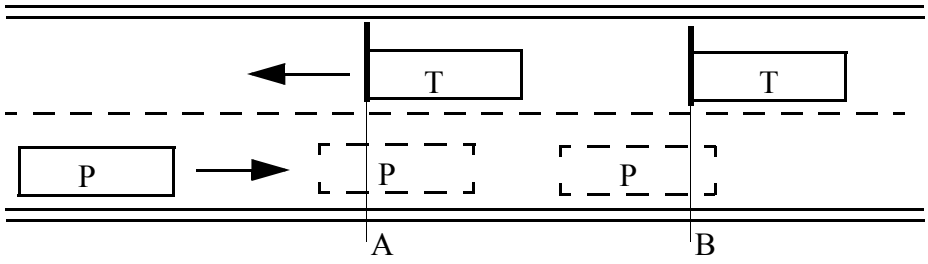
"P" or "T" 2nd or 3rd Position

A and B Reference Points on Highway

1. Following:
Officer turns time switch "On" when target vehicle passes point "A" and "Off" when it passes point "B". Officer turns distance switch "On" as the police car enters point "A" and "Off" when it enters point "B". The calculated average speed is immediately displayed.

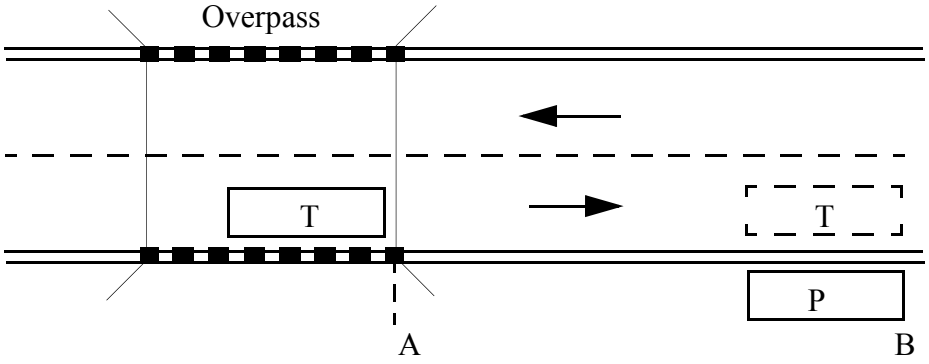


2. Opposite Direction:
Officer turns on time switch as s/he sees target vehicle pass point "B". When the police car gets opposite the front of the target car (point "A"), officer turns "Off" the time switch and simultaneously turns "On" the distance switch, then goes to point "B" and turns "Off" distance switch. The calculated average speed is immediately displayed.



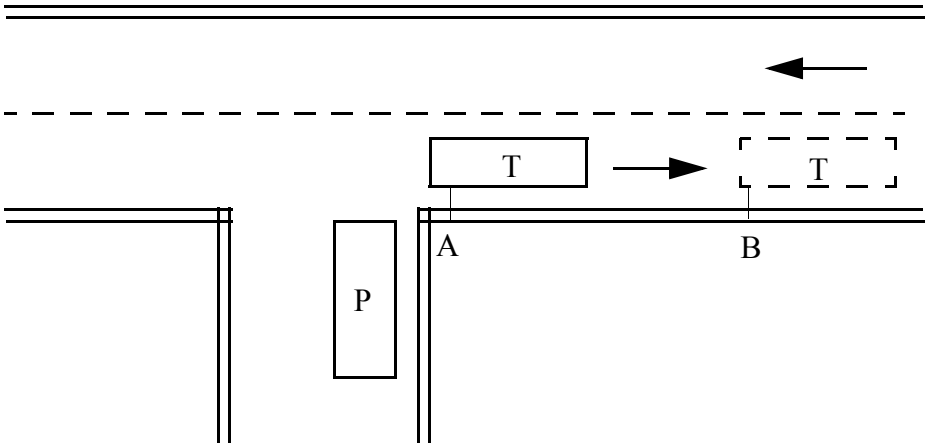
3. Parking:

The police officer drives from point "A" to point "B" with distance switch "On" at "A" and "Off" at point "B", and parks off the road. As a target car, viewed through officer's rearview mirror, passes point "A", the officer turns time switch "On" and "Off" as it reaches point "B". The calculated average speed is immediately displayed.



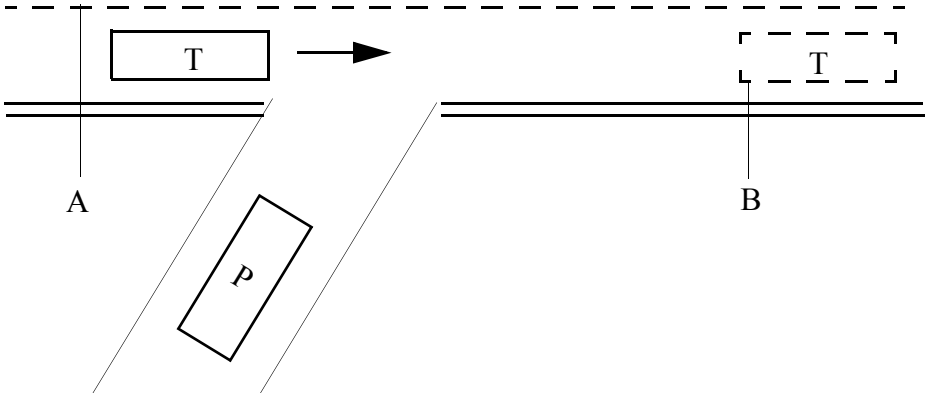
4. T-Intersection:

The police officer is parked out of a normal driver's vision on the main roadway. As the rear of the target car passes point "A", the time switch is turned "On". Police car then drives on to the road and turns "On" distance switch when officer passes point "A". The officer now proceeds to follow the target car until s/he passes "B", at which time s/he turns "Off" the time switch. When the officer reaches point "B", s/he turns "Off" the distance switch, and the calculated average speed is immediately displayed.



5. Dial-A-Distance:

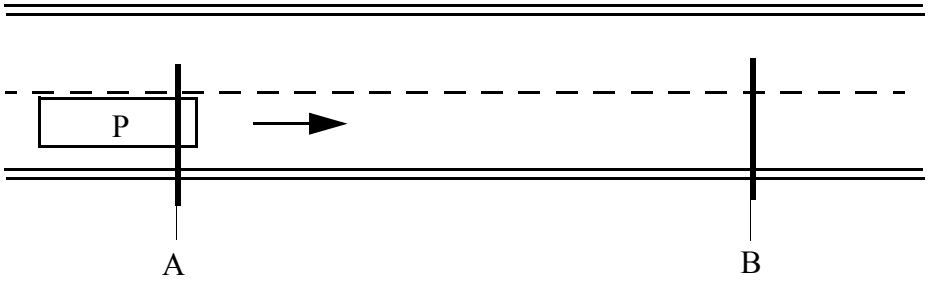
The police officer is parked in a position of maximum concealment, and yet where he can clearly see Reference Points "A" and "B". Having previously measured the distance between "A" and "B", s/he now dials in the distance on the thumbwheel switch. By use of only the time switch ("On" at "A" and "Off" at "B"), the officer can repeatedly clock cars until he gets a flagrant speeder.



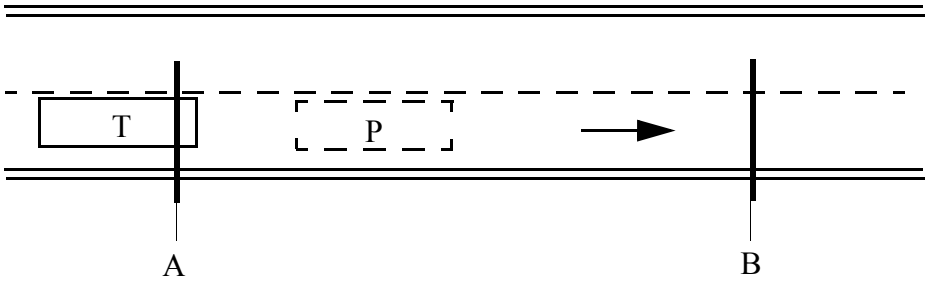
6. Target Vehicle Approaching From the Rear:

The calculated average speed is immediately displayed.

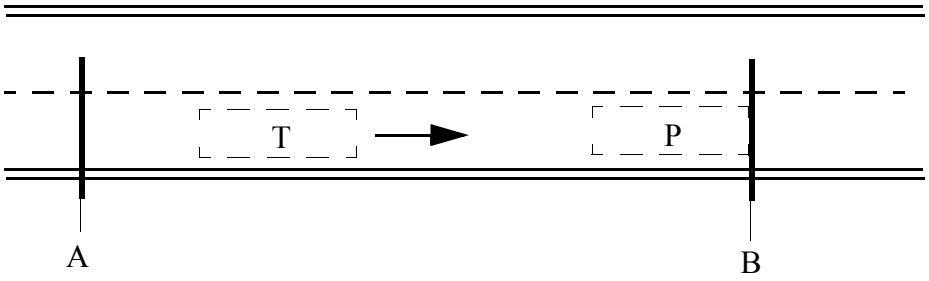
A. Officer turns "On" distance switch at Reference Point "A".



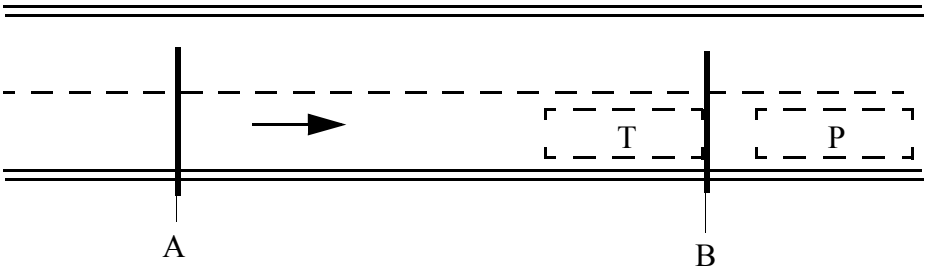
B. Officer turns "On" time switch as target car seen through rearview mirror crosses Reference Point "A".



C. Officer turns “Off” distance at Reference Point “B”.



D. Officer turns “Off” time as target car seen through rearview mirror crosses Reference Point “B”.



Ref. 10 J.S. Baker, *Simple Estimates of Vehicle Stopping Distances and Speed from Skidmarks: Topic 818 of the Traffic Accident Investigation Manual** (Northwestern University Traffic Institute, 1985)

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The following explanations are intended to help police, attorneys, and other investigators to estimate speeds of vehicles based on skidmarks in simple cases and vehicle stopping distances under certain conditions.

Speed From Skidmarks

It is well known that when brakes are applied hard (for example, to avoid a hazard), they may lock wheels and keep them from turning. As a result, the vehicle slides. The friction between tires and road usually, but not always, leaves visible skidmarks. The length of these marks is an indication of the speed of the vehicle.

Two factors are important in estimating speed from skidmarks: (1) the distance the vehicle slid and (2) the slipperiness (coefficient of friction) or drag factor of the surface on which the sliding took place.

The steps to take in going from observations of marks on the road to calculating the speed of the vehicle which made them are as follows:

1) Make sure that the marks are true skidmarks made by tires on wheels which were not rotating. Friction marks might be scuffs made by steering (yaw marks), acceleration, or overdeflected tires. Any of these other marks are likely to be referred to incorrectly as skidmarks. Usually skidmarks:

- Are nearly straight, or at least do not clearly swerve.
- Are visible for all wheels, or at least one on each side.
- Are nearly equally distinct for left and right tires.
- Begin and end at fairly distinct points rather than gradually appearing and disappearing.
- Are equally distinct for both edges of the tire.
- Have striations or rib marks, if any, parallel to the marks.

2) Decide whether all wheels locked or were nearly locked. This is easy if all wheels make clear marks. If all wheels of a normal passenger vehicle do not make marks, assume that all wheels were braking as though skidding. Consider the vehicle as fully sliding unless:

- There are definite signs that the vehicle was rotating or swerving.
- There is a definite reason to believe that some brakes were not functioning.

Vehicles such as motorcycles, tractors, and trailers may have no brakes on some wheels or may have brakes which are applied separately to some wheels. In stopping these vehicles, therefore, some wheels may contribute little or no

drag and so must not be considered as fully sliding unless all wheels leave definite skidmarks.

3) Determine how far the vehicle slid with braking equivalent to that of having all the wheels locked. If you have an opportunity to do so, measure the length of each skidmark separately. If front and rear marks are superimposed so that you do not know whether the first mark was made by a front or rear wheel, consider it to be a rear wheel and assume that the front wheel began to slide a distance from that point equal to the distance between the front and rear wheels of the vehicle. If all wheels make marks, use the length of the longest mark. If it is not known whether each mark was measured separately or measurement was made from the beginning of a rear wheel mark to the end of a front wheel mark, assume that the latter was the case. Then deduct the wheelbase of the vehicle, usually 9 or 10 ft., from this distance to obtain the sliding distance. This will possibly give a shorter sliding distance and so a conservative or minimum speed estimate.

4) Evaluate how much drag the tires and road surface produced to slow the vehicle with all wheels locked. This drag factor is the retarding force compared to (divided by) the vehicle's weight. For example, a drag factor of 0.5 means that the retarding force is equal to half of the weight of the vehicle. The drag factor is the coefficient of friction between tires and road on a level surface with all wheels sliding. If the surface slopes up or down or if not all wheels lock, the coefficient of friction is not the same as the drag factor.

One way to determine the drag factor is to make a test skid. Duplicate as closely as possible the conditions under which the accident skid was made. It is best to use the same vehicle driven in the same direction at the same location and at approximately the same speed. If the accident vehicle cannot be used, another vehicle, for example, a police car, can be substituted. Usually this has little effect on the results.

To obtain the drag factor from a test skid, on the left scale of the nomograph, locate distance taken to slide to a stop on the test skid. On the middle scale locate the speed at which brakes are applied. Draw a straight line between these two points and across the right scale. The drag factor is read from the right scale where the line crosses it.

Unfortunately, test skids are not as useful as one might think. They are often impractical or dangerous at the specific site of the accident or at the approximate speed of the vehicle that made the accident skids. Moreover, test skids often give too great a drag factor because brakes are not applied quickly enough or strongly enough to lock all wheels instantly. It requires considerable strength, skill and practice to make test skids properly. If wheels are not locked instantly, the test vehicle may lose speed by braking before skidding begins to make tires hot enough to mark the road. Then, if braking distance is obtained by measuring the test skidmarks, the skidding distance is short for the speed and the drag factor will be high. When applied to accident skids, this high drag factor gives an overestimate of speed, sometimes a considerable overestimate. Accurate speedometer readings for test skids are also difficult to obtain.

Hence if test skid results give drag factors greater than those mentioned hereafter, regard the results of the test with suspicion. The test may have to be repeated by a more experienced investigator.

Lacking proper test skids, approximate drag factors may be used. For hard, dry, clean, level, well travelled paving at essentially urban speeds less than 35 miles per hour, 0.60 to 0.80 will be reasonable. For speeds of more than 40 miles per hour, 0.55 to 0.70 would be appropriate. The lower figure gives more conservative speed estimates; the higher figure gives less conservative estimates. Tests may be needed or data may have to be obtained from other sources for wet roadways (which rarely show skidmarks), slopes great enough so that a car in neutral without brakes will roll on them, gravel, grass, and other unusual surfaces.

5) On the nomograph chart, find the skidding distance on the left scale and the drag factor on the right scale. Draw a straight line between these points. The speed required to slide to a stop is indicated by the point at which this line crosses the middle scale.

6) Remember that the estimate represents the speed to slide to a stop. If the slide is not to a stop but ends in a collision, rollover, or fall without ground contact, the starting speed will be higher. How much higher depends on how much speed remained at the end of the skid. Never add estimated speed at the end of a skid to the calculated slide-to-stop speed. These speeds must be combined in another more complicated manner. Thus the speed estimated by Steps I through 5 can be considered a minimum, especially if low values are used for drag factor.

There are a number of minor influences on speed required to stop in a specified distance: weight of the vehicle, temperature, tire material and pattern, air pressure in tires, wind velocity, and others. The influence of these conditions is, for general purposes, insignificant and may be ignored.

Stopping Distances

A vehicle is usually stopped in two operations: 1) driver reaction during which the vehicle loses no speed; and 2) vehicle braking which slows the vehicle to a stop.

Consider the second operation first. How far a vehicle goes while braking to a stop depends on how fast it was moving to begin with and how much slowing drag the brakes and road surface can develop. Two rates of slowing can be specified in most cases: 1) maximum slowing and minimum stopping distance determined by the friction of the road (drag factor); and 2) maximum stopping distance permitted by law. In the first case, brake pedal pressure beyond that required to lock wheels produces no shorter stopping distance, assuming that brakes and driver are capable of locking the wheels. Although on slippery surfaces, the vehicle may not in fact stop in the legal maximum distance.

Exhibit 1: Skidmark - Speed Nomograph

Steps required to estimate braking distances are as follows:

1) Specify the speed from which the stop is to be made. This may be the speed limit, a speed at which a driver stated he was travelling, or some other speed.

2) Determine the drag factor which represents the rate of slowing. For maximum slowing (and minimum braking distance) use values for skidding with all wheels locked in the same way as in estimating speed from skidmarks, either by test skid or by using indicated values. This applies only if the vehicle is capable of locking all wheels on the surfaces involved. If all wheels cannot be locked for any reason, the assumptions required and their effects are too complex to be discussed here.

To obtain the drag factor for legal maximum braking distance, consult the motor vehicle code or whatever regulation applies. Requirements vary from state to state. Standards of the U.S. Department of Transportation may also apply. In laws and regulations, brake performances may be stated in one or more of three ways:

- Braking force as a percentage of gross vehicle weight. Divide this number by 100 to get the drag factor. For example, a braking force of 52.8 percent of the vehicle's weight is a drag factor of 0.528, resulting from 52.8 divided by 100.
- Deceleration in feet per seconds squared (ft/s^2). Divide this deceleration by 32.2 ft/s^2 (the acceleration due to the force of gravity) to get the drag factor. For example, a deceleration of 17 ft/s^2 is a drag factor of 17 $ft/s^2 \div 32.2\ ft/s^2 = 0.528$.
- Stopping distance from a specified speed, usually 20 miles per hour. On the left scale (distance) of the nomograph chart, find the specified distance. Draw a straight line from this point across the middle scale at the specified speed. Read the drag factor for minimum braking where this line crosses the right scale. This is exactly the same as obtaining the drag factor from a test skid.

Legal braking distances for large trucks may be in terms of both a distance to stop from 20 miles per hour (or other specified speed) and a sustained rate of slowing. These are too complex to be explained in this publication.

3) On the nomograph (figure 1), locate the desired speed on the middle scale and the selected drag factor on the right scale. Draw a straight line through these points on the two scales and extend it across the left scale. At that point, read the braking distance required to stop under the specified circumstances.

Now consider driver reaction. The time depends on how much thinking is required to decide what to do. When reaction time has been determined, vehicle speed (velocity) will yield distance travelled in reaction time. Reaction distance added to braking distance gives the total stopping distance.

4) Select an appropriate thinking reaction time.

- **For a simple reaction**, the driver has decided in advance what to do if something expected happens. For example, he has decided to brake if the

traffic signal turns yellow or if the brake lights of a car ahead light up. The decision has already been made so time required from perception to action is short: 0.20 to 0.30 seconds for most people. Drivers more than 50 years old generally take a longer time.

- **For complex reaction**, the driver has to evaluate the hazard after he perceives it and then decide which of several possible evasive tactics to employ. The additional thinking takes longer. For example, deciding whether to steer, brake, or accelerate when a child unexpectedly runs into the roadway from between parked cars or a car entering the roadway from a driveway unexpectedly fails to stop. Depending on how complicated the situation is, complex reaction may require from 0.3 to 1.3 seconds. Inexperienced and older drivers in more complicated situations take a longer time.
- **For discriminative reaction**, one has to seek additional information to decide what to do. For example, a driver must try to remember which direction to steer if rear wheels sideslip, or watch for other signs when an approaching driver appears to have given the wrong turn signal, or whether the exit he is approaching will or will not take him to his destination. Discriminative reaction may require from a second to a minute or more. Often time is not available to think out what to do so the driver decides on a complex reaction, which may or may not be satisfactory. For example, he may decide to stop to look at a map or examine his tires before going farther. Inexperienced and older drivers are more likely to require discriminative reactions and take longer to complete them.

5) Decide how much time is required for muscular movement to begin to actuate vehicle controls. If a driver has decided to steer and hands are already in position, no additional time is required. If he has to move his foot from accelerator to brake pedal, allow 0.2 to 0.3 seconds, depending on distance to be moved, weight of footwear, strength and agility of the driver. Reaching for switches or other controls on the dashboard may require 0.3 to 0.6 seconds.

6) Add thinking reaction time (Step 4) to muscular reaction time (Step 5) to get total estimated reaction time.

7) On the right side of the middle scale of the nomograph, locate the speed (from Step 1). On the left side of the same scale, read the corresponding velocity in feet per second.

8) Multiply the velocity (Step 7) by the total reaction time (Step 6) to get the reaction distance.

9) Add the braking distance (Step 3) to reaction distance (Step 8). This gives the total stopping distance from the specified speed.

Reliability

It is clearly impossible to determine precise values for such factors as distance a vehicle has slid, drag factor, and reaction time. Possible high and low values may therefore be used to give a range for each estimate. Sometimes it is possible to make test skids to determine drag factor more precisely. If these

are not properly made, they may make the drag factor used less, rather than more, accurate.

If all values are taken to give a low speed or long stopping distance the final estimate will be conservative. On the other hand, values might be chosen to give a high final estimate. In most cases it is desirable to express the estimate as a range of values from high one to a low one. The extent of this range depends on the range of values which can be relied on as factors or elements used in making the estimate.

The nomograph used here is not derived from statistics and experiments; it simply represents a graphic method of solving an equation derived from mechanics. The equation for speed is $S = 5.5\ df$; the equation for distance is $d = S^2/30f$. In these equations, S = speed in miles per hour, d = distance in feet, and f = drag factor. The numbers 5.5 and 30 are constants which adjust the equation to the units of measurement used. They would be different if the distance were measured in meters instead of feet. A calculator can be used with these equations to give the same results as the nomograph.

The steps described here outline procedures which will usually result in satisfactory estimates in simple straight-forward cases. But cases involving questionable tire marks; special vehicles such as motorcycles, trailers and overloaded trucks; significant slopes; and unusual braking systems require additional information and possibly expert assistance.

Sources

Author

J. Stannard Baker is a traffic engineer specializing in traffic-accident investigation. He was director of Research and Development at the Northwestern University Traffic Institute from 1946 to 1971 and continued thereafter as a guest lecturer and consultant at The Traffic Institute.

Exhibit

The Skidmark-speed Nomograph was designed by J. Stannard Baker at The Northwestern University Traffic Institute.

Other Material

More detailed information on estimating speeds and stopping distances will be found in a number of other topics in the *Traffic-Accident Investigation Manual*.

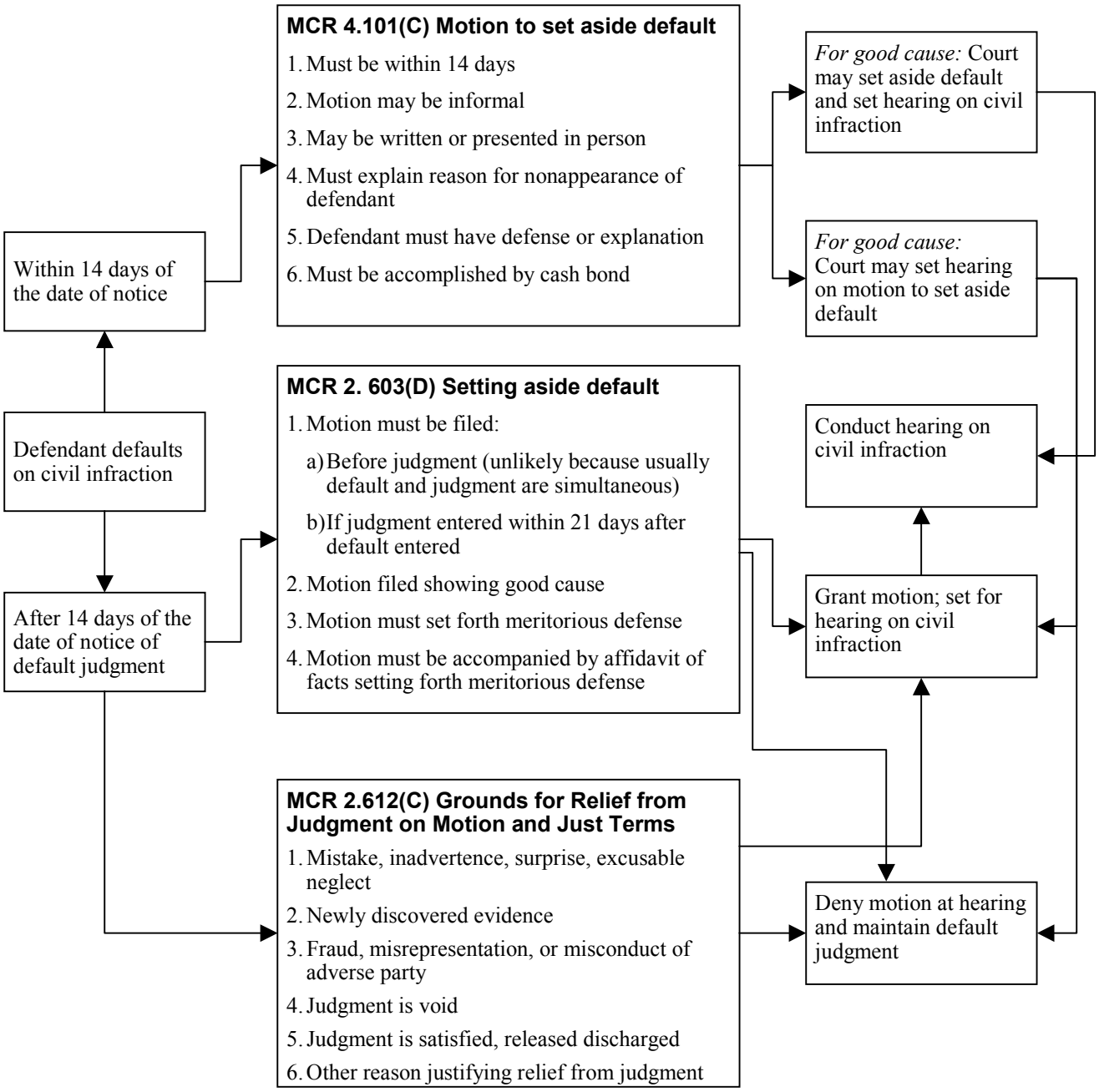
Ref. 11 Judicial Ethics Opinions

Opinion JI-10

Opinion JI-77

Ref. 12 Chart: “Speed (MPH) Required to Slide to a Stop”

Ref. 13 Flow Chart to Set Aside Default on a Civil Infraction



Ref. 14 Criminal Offenses for Which Courts Have Authority to Order Licensing Sanctions

Ref. 15 Recommended Range of Fines and Costs Schedule